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IMPORTANCE OF CONTINUOUS TRANSPORT IN LOGISTICS

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Abstract:
Connection of suppliers and customers by permanent transport route with continuous transport is by logistics staff neglected and the same time it is a supply system without which we cannot currently exist. Nowadays, it is separated the holding of transmission network from the owners of the sources and also there are enterprises for exchange of sale by customers. By this way it is created an interesting logistics system linking several suppliers, owners of transmission-transport system, vendors and also large group of customers. Management of this system, the logistics is very interesting and important, because by the management must take into account not only the long-term and short-term planning but also the operational management and management in the real time. The goal of this article is to draw attention to this interesting and challenging issue in logistics.

Key words:
Transport, logistics, continuous, importance

1 INTRODUCTION

What is it, or rather, what does it mean continuous transport and how does it dovetail into logistics? At the first glance, it is a simple answer, because it is always a connection of suppliers with customers. Not always and not everyone sees it by this way. Much of "logistics" as a logistics process will not introduce the electricity grid when the electricity supply to customers is no problem. Of course, that is not by this way and there are several problems in this network. Therefore, we try to explain some special speciality of continuous transport in logistics.

The supply chain and the supply chain management – SCM is used for connection of supplier with consumer by suitable transport channel. The supply network or the Supply network management – SNM is used for connection of supplier with several consumers. But it can be oppositely. Some suppliers are connected with one consumer. It is possible to connect several suppliers with several consumers and the problem is more complex.

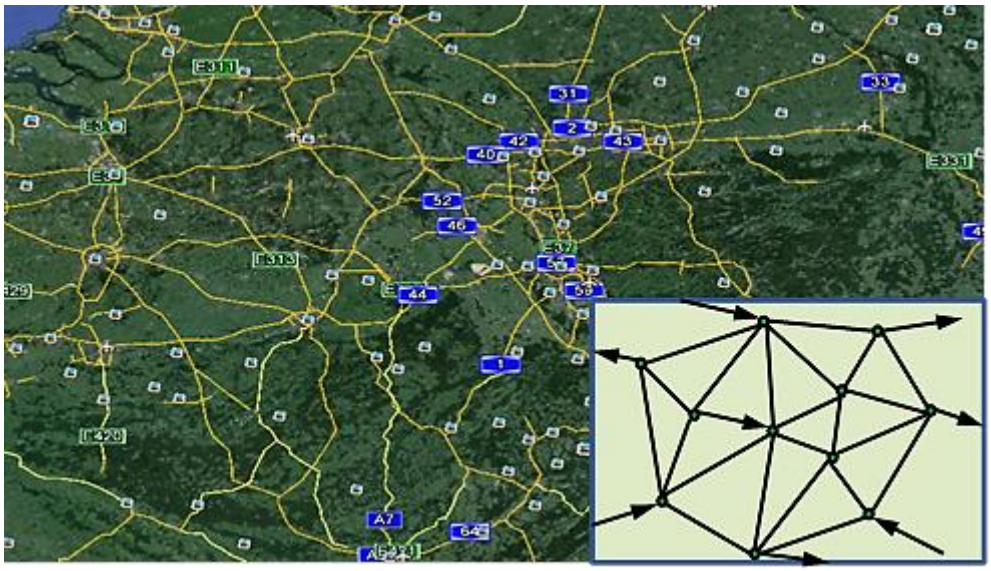

Fig. 1. Example of the transport network and the drawn chart

Connection of several suppliers with several consumers can be realized by different ways and we have very difficult transport system, where the inputs are presented by suppliers and the outputs are presented by consumers and among them is more or less difficult transport network. At this moment, we must deal with the theory of graphs and graphic structure. It is one way how graphically present connection of several inputs with several outputs (Fig. 1).

A well-designed and well treated graph is the best way how we can see to the transport network. This fact is important for us because how can we present the graph as a picture? For the work with the graph, the more favourable is to describe it with mathematical or mathematical-logical relations. The theory of graph gives us all the ways how to work with the graph. The input and the output nodes are connected with the branches and with them we will deal in the next text of this article.

2 SUPPLY CHAIN

If we will obtain to this name, so we know that the segments in the chain are in the vast majority of cases connected – they are linked to each other in series. Among one input and one output is the connecting way, a connecting channel.

The connecting "chain" can be on principle of two kinds. One important characteristics is that the connection of two players is permanently installed, for example electric line. Quantity of the transported "goods" is then given in most cases by physical properties of this connection, a route of travel. This connection can be called parametric because the transported quantity is given by the parameters of the transport channel.

The connecting chain can be created for example by the road, with cars which transport the "goods" with different design and capacity, which is not always used at 100%. The transported amount is in this case given by the quantity which is loaded on this vehicle. Because on the part of system properties the transported amount is different, so this connection is possible to call stochastic.

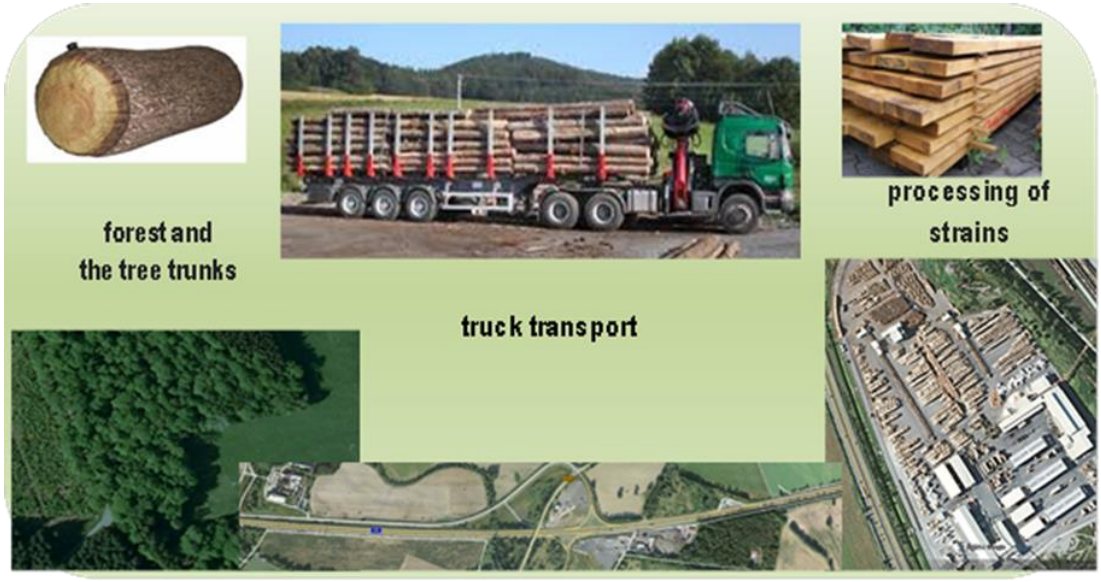

Fig. 2 Example of supply chain from raw materials through nonparametric transport to production process

There is also one significant difference between these two ways of transport. In the case of parametric connection, when the connecting channel connects permanently the supplier and customer and exactly it is not conveyed any goods, the transport channel is unused. Because the costs for its creation are included to the fixed amount that is predetermined, and the customer pay only for the transported amount.

In the case of not parametric connection, the connecting route is created from different other reasons and its significant part was not specially created for the determined transport channel. The customer does not pay fixed amount for the transport route. The transport means (car) is loaded at the supplier, it runs to the place of consumer, it is load out and it stands mostly empty and unused. Then it goes back without the cargo, or by the return route it receives some goods or it must be stopped and wait for the next use. This is the fact which complicates the use of transport route with no parametric character.

3 SUPPLY NETWORK

Connection of the place of supplier and customer by one transport route, by parametric is mainly used in the production process of the enterprise, i.e. in the intra plant transport and onôy exceptionally for connection of two or more customers. The characteristics of the transport network in our view is among the supplier and customer, and there is a permanent connection in the transport routes, and the customer takes away from this network what he needs and in times of need.

From this simple and truthful issue, we can conclude that for example the connection by the road has the permanent character, but the goods must be ordered at the supplier, loaded on the transport means and only after overcoming of the transport distance among the supplier and the customer, the customer gets the goods. We repeat again that the quantity of the transported goods is given by the fact, how many goods are loaded on the transport means by the customer.

In the parametric connection it is different. The customer with the supplier are connected by the electric conductor or pipe and the goods is stored in the whole length of the transfer channel and the customer can take away this goods immediately after the channel opening at the customer. The supplier does not affect the amount of the demanded goods. This is

theoretically correct but in practice the supplier must have the capacity to deliver the required amount and this is not unlimited.

For the fact, that the supplier will have certainty that the customer will not complain, it is in advance what quantity per time period can customer takes away from the network. Maximum quantity is often set by capacity of the transport channel, for example by diameter or length of the tube, so by parameters of transport route and therefore this connection is called as parametric. It is determined the limit and after achievement of this limit the customer takes away from the network the quantity that he needs. A well-known example is the distribution of water, when we take away quantity, what we need. But this is not in a matter of fact. This quantity is limited by aforesaid conditions which are not perceived until we get the limit given by the construction of the network and parameters of pumps. These are presented by "edge conditions", but these conditions we cannot easy change and with these conditions the consumer and supplier must count. So, we can deal with parametric transmission channels and transmission networks from practical point of view.

4 LINE CONTINUOUS TRANSPORT

Supplier and consumer are connected by continuous transport channel which does not change in the long term. This is presented by the Fig. 3.

Fig. 3 Example of a connection supplier and customer by belt conveyors

The supplier is in the our case pit for mining of some raw material, for example coal, iron ore, limestone, but it can be also a workshop manufacturing car bodies and workshop for final assembly of cars, or dishwasher of beer bottles and filling machine, etc. There are several cases and the question is that the consumer pays to the supplier for the goods, or it is a part of the production line and then the financial side is secondary.

We consider about the time chart by raw material transport (presented by the Fig. 4). The raw material is loaded on the belt conveyors and it is always dependent on the work of loading machine and this does not work constantly, so continuous, but it has shorter or longer breaks, for example by movement from the one place to the other place. In these cases the raw materials is transported with breaks with statistical character, because filling of the raw materials is depended on several different conditions which changing during the mining.

Fig. 4 Connection suppliers with the customer via a measuring device on the quality and quantity of coal

So we have an example when the supplier is directly connect with the customer by transport channel which can continuously convey material which is loaded at the beginning of the transport line and even though the transport is interrupted by different operating conditions. The movement of the material on the belt conveyor is interrupted but the transport channel connects the supplier with the consumer.

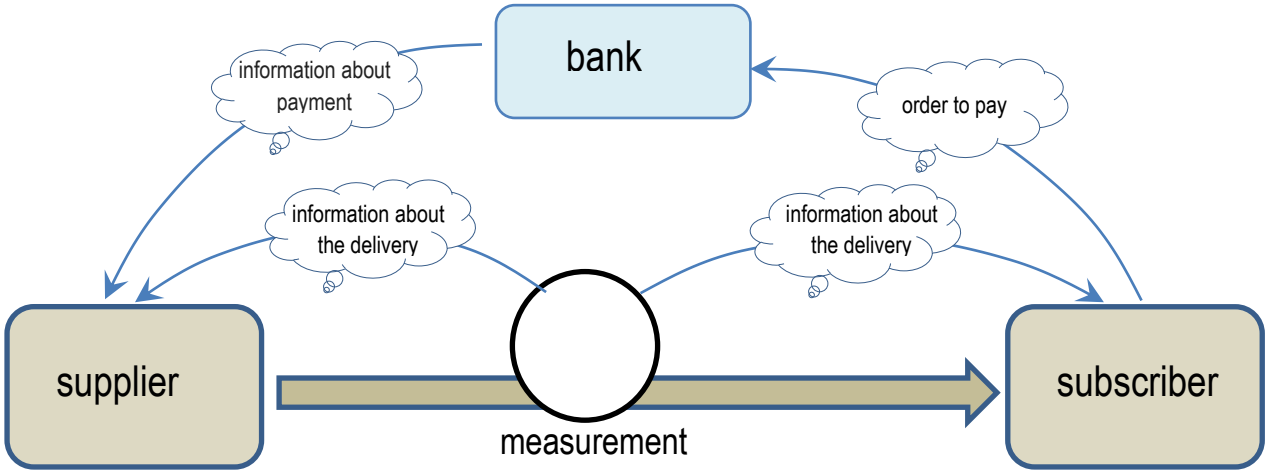

Fig. 5 Linear continuous transport as a logistics system linking one supplier and one customer

Another interesting example of the continuous transport is connection of power plant with coal quarry by belt conveyor. Supplier is a coal mine and wheel excavator with continuous conveying of coal from the mine to the powe plant. Because the power plant and mine have not the same owner, so the consumer, i.e. the power plant does not want to pay for coal with poor-quality. Therefore there is realized a measurement of coal quality in the selected parts of conveyors.

These problems are not by parametric transport, because the weight of shipment or number of pieces are easily checked by supplier (by loading) and also by consumer (by unloading of goods). Fig. 5 presents the total transport system by linear continuous transport connecting one supplier with one consumer.

Finally, it is possible to state, that continuous transport, which connects one supplier and one consumer is given by the fact that among supplier and consumer is permanently installed transport channel which is prepared for conveying.

Another example of logistics of continuous transport is control of oil conveying from the source to the consumer (presented for example by the Fig. 6).

Fig. 6 presents the sample of parametric connection of source with consumption.

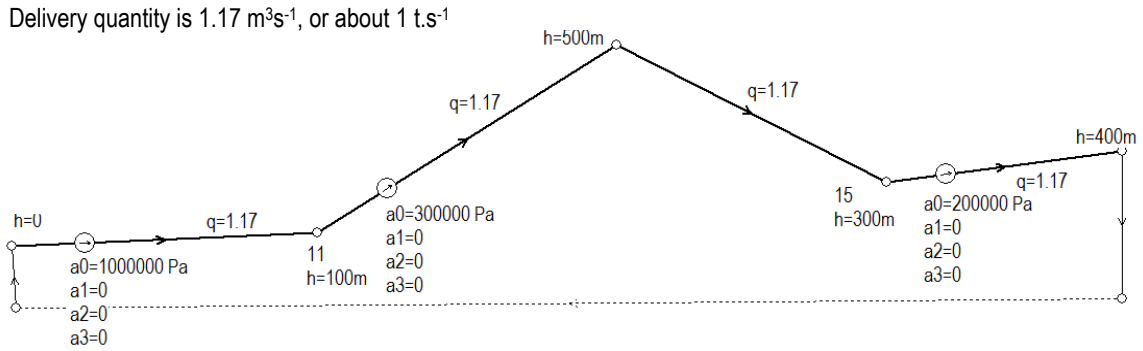

Fig.6 . Example of parametric resource links and customers in the transportation of crude oil

Quantity of conveyed oil is given by two groups of parameters. One group is presented by long-term static parameters, i.e. diameter of tube, length of tube, place of consumption, quality of the internal side of tube. These parameters cannot be controlled in the field of operative control because they are considered for constant, or invariant. In the field of planning, by medium-term and long-term control these parameters are changed.

The second group of parameters in this parametric connection, it is possible to control. The goal of control is in this case transported amount of oil.

5 PARAMETRIC TRANSPORT NETWORK

Parametric transport network, a permanent parametric connection of supplier and customer is in our lives, so common, that it is not perceived, and it is considered as certainty. It is presented by engineering networks without the life in a technologically advanced society is unthinkable or rather impossible. The customer is permanently connected with supplier, in the supply chain and the supplier is connected with subsupplier, they are connected together in the whole supply chain. This supply chain, its branches and parts are connected regularly through financial bureau. Fig. 7 presents this type of connection on the basis of logistics rules. Connection through financial bureaus forms reverse connection and it is a real information flow for control of the whole supply chain. The base of existence of this logistics system is in majority of cases mass and energy flow. Fig. 7 presents an example of supply chain for heat. The whole system consists of several independent parts. The main parametric network is the base of the whole system and it is formed by tube with heat isolation allocated underground. The input part of the system is a converter which release heat and transfers it to the transport element (water or steam). The distribution network has some interchange stations which change the heat to own parameters with minimization of heat loss.

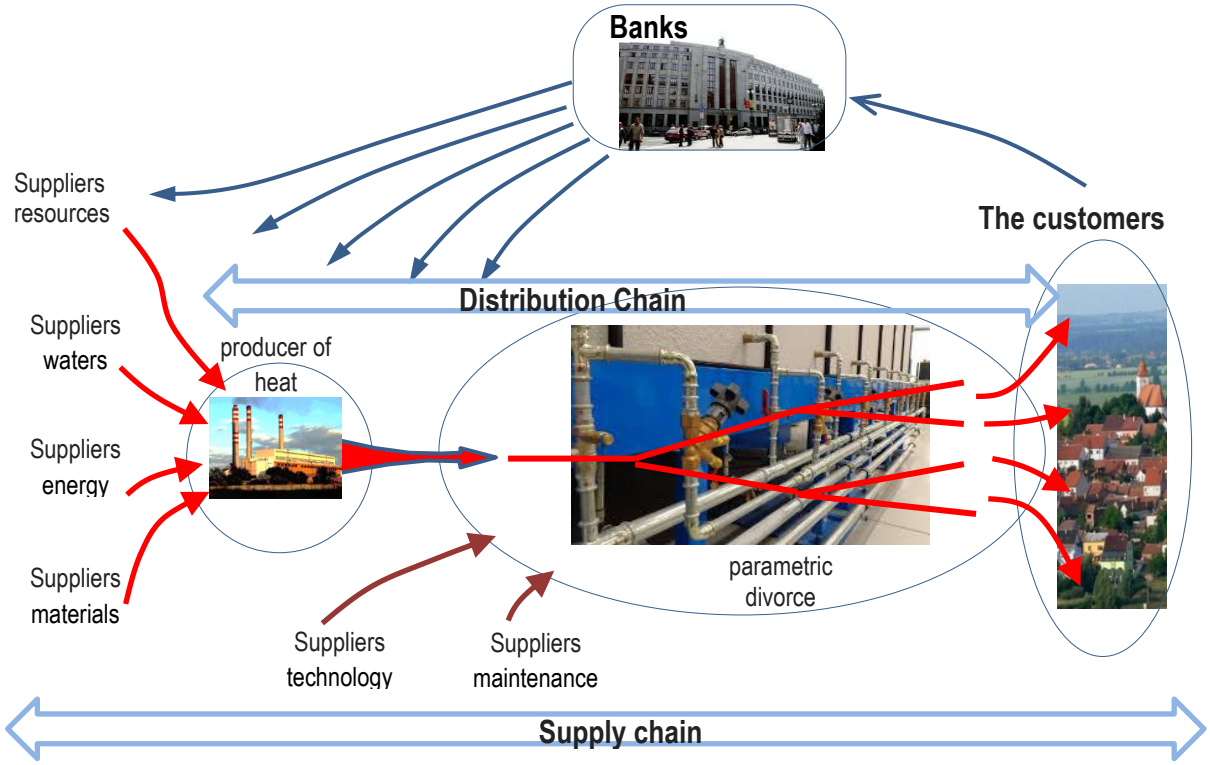

Fig. 7 The supply chain management with heat continuous transport into parametric networks

Control in real time is provided by consumer, by own requirements. Operative control is realized by dispatching which regulates changes of consumers need by the temperature, set of

regulation ventile. In the difficult networks is necessary to plan connection beyond classic separation, i.e. cross connection. In this case great advantage is used program for calculation of networks, for example program Grafsi by Colleg of logistics.

Medium-term control and also long-term control (planning) belong to aforesaid elements in the enterprise control. Medium-term control is in this case control by supply chain in summer and winter.

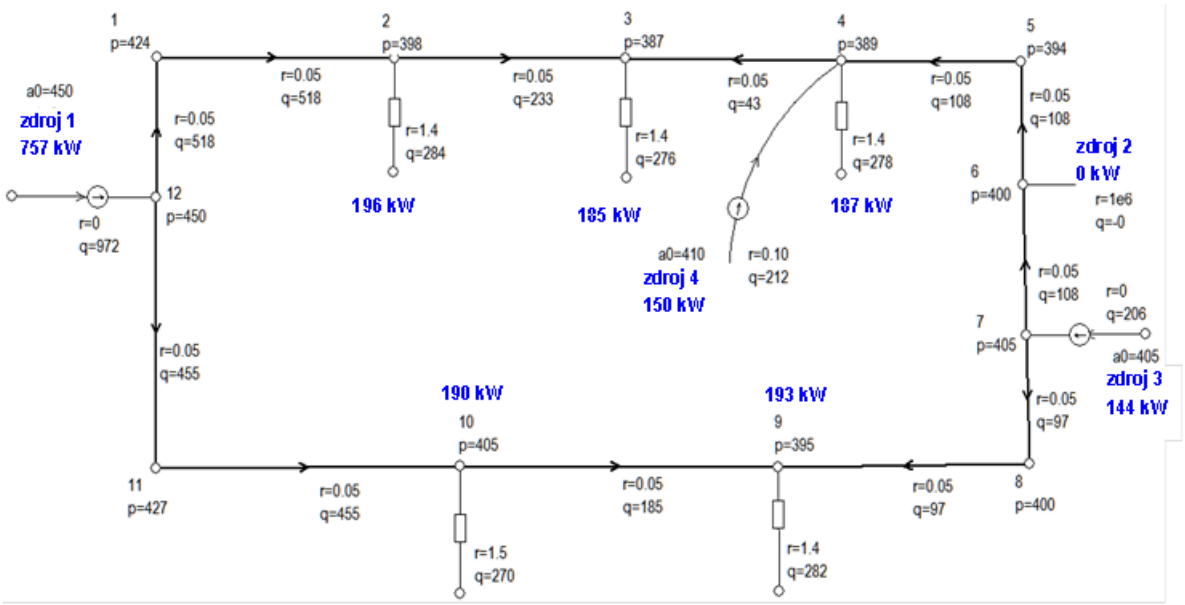

Fig.8 Example of connection electricity suppliers with customers, with supply chain in parametric network

Strategic control, i.e. long-term planning means planning reconstruction of network, in the case, that it is needed, provides the other supplier for competition, planning of repairs of branches with end of life, planning of irregular control of sources and branches, etc.

6 TUBULAR POST

The other logistics problem is a management of conveying by tubular post. For somebody this is not a part of logistics system, but this is not a truth. Suppliers and consumers are connected by permanent transport network and the speed of transport is equally high. Fig. 9 presents an example of tubular post in the hospital.

Management of this transport chain is not difficult logistics systems. It is not difficult but in regard to the speed of movement and energy for transport of containers in the tubular network with many branches is equally difficult and therefore there is a need to deal with this problem from the view of logistics. Already at least 150 years, some engineers dream about the possibility of delivering as well as by tubular post people and also goods in a liquid state. One of the designers of this type of transport is the Transport faculty of Czech Technical University in Prague and College of logistics in Přerov. Together with other universities is formed design of solution of "tubular post of great diameter in Europe". Details of this design are not the goal of this article, but this design can decrease transport by trucks. Fig. 10 presents only informative conceptual design of transport routes for tube transport of goods in Europe. This design is based on the forecast of distribution of populated parts of Europe around the year 2500. We finish this reflection and we accept the declaration of investigators that later solution of this type of transport in logistics can cause greater damages to nature.

Fig. 9 View of part of pneumatic post in the hospital (source: Google Images, Stöebich Fire

CONCLUSION

The main idea of this article was the fact that it is possible to find an opinion of logisticians, that logistics is SCM, so called supply chain management, or management of supply network and continuous transport is dropped from the solution. Also, logisticians refer to the definitions of logistics in which the terms are complicated, but they are not wrong, but definitions is by this reason not exact. In addition, they are either good or they are useless. Also there are some terms which are valid for management in general and in the definition of logistics they not bring nothing new or original.

By this way, it is created the mixture of terms, which are not wrong, but quite they not make clear the own term of logistics, because as it was said in the article, the logistics is "control of transmission".

The last and the main reason for writing of this article is the fact, that several logisticians have impression and some of them are sure that logistics deals only with supply chain, but if the connection of supplier and customer is assured by permanent line element, it is not a logistics. It is needed to say that they do not reflect about the fact, that this permanent connection is used for transport only sometime, only a few times a day. Therefore, I must notice that the connection of supply and customer is permanent and it is often connect with transport network which has certain capacity, and this capacity of the supply product set directly in the network can be considerable complication for management of supply chain by failures. The paradox in the consideration of some logistician is the fact that the transport connection for example for railway is not be considered by permanent connection, even though it has nearly the same character as the connection by electric conductor.

References

[1] Malindžák D. et al.: Modelovanie a simulacia v logistike. Učebnice TU Košice. Slovensko, 2009. ISBN 978-80-553-0265-2. 182 p.
[2] Malindžák D. et al.: Aplikacia modelovanie a simulacie v logistike podniku. Učebnice TU Košice. Slovensko,2009. ISBN 978-80-553-0264-5. 286 str., 153 obr.
[3] Malindžák D. a kol, *Teorie logistiky*. KARNAT Košice, Slovensko, Listopad 2007. ISBN 978-80-8073-893-8. 215 p.
[4] Strakoš V., Kavka L. a Kolomazník I.: *Logistika a modelování potrubní dopravy*. Přerov: Vysoká škola logistiky o.p.s., 2012. ISBN 978-80-87179-28-4.
[5] Strakoš V.: Zásobování obyvatel energiemi jako logistický proces. Acta Logistica Moravica. 2012, Vol. 2, No. 3, 9 p. ISSN 1804-8315. Available on: <http://web2.vslg.cz/fotogalerie/acta_logistica/2012/3-cislo/1_strakos.pdf>
[6] Strakoš V., Motalová K.: Logistika a zásobování oblasti vodou. Acta Logistica Moravica. 2012, Vol. 2, No. 3, 16 p. ISSN 1804-8315. Available on: <http://web2.vslg.cz/fotogalerie/acta_logistica/2012/3-cislo/5_strakos.pdf>
[7] Strakoš V. Dopravní sítě v energetice. Studie v rámci projektu Energy4Y, CZ.1.07/2.4.00/17.0077. 62 p.
[8] Strakoš V. *Obnovitelné zdroje energie a přenosová síť elektrické energie.* Studie v rámci projektu Energy4Y, CZ.1.07/2.4.00/17.0077. 109 p.